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Tuning the theta temperature and critical micellization temperature of polymers in ionic liquids TIMOTHY LODGE, MEGAN HOARFROST, University of Minnesota — Ionic liquids feature a combination of properties that make them very interesting solvents for polymers, but questions remain regarding the thermodynamics of polymer/ionic liquid solutions. In this work, the lower-critical-solution-temperature (LCST) phase behavior of poly(*n*-butyl methacrylate) (PnBMA) in mixtures of the ionic liquids 1-butyl-3-methylimidazolium: bis(trifluoromethylsulfonyl)imide ([BMIm][TFSI]) and 1-ethyl-3-methylimidazolium:TFSI ([EMIm][TFSI]) is characterized by transmittance, light scattering, and small-angle neutron scattering measurements. Relevant thermodynamic parameters are readily tuned by varying the ionic liquid composition. In particular, the cloud point, spinodal, and theta temperatures are all found to increase linearly with [BMIm] content. The interaction parameters are determined as a function of temperature and concentration using three different methods, and the results from each method are compared. The theta temperatures are then compared quantitatively to the critical micellization temperatures (CMTs) for PnBMA-poly(ethylene oxide) diblocks, to test the proposition that the CMT corresponds to a fixed value of chi.

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